REMARKS

Claims 1-19, 21, 23-54, 57-81, 82-104, and 168-172 are presently pending in this application. Claims 105-167 have been withdrawn from consideration as being directed to a non-elected invention. Claims 20, 22, 55, 56, and 82, canceled, and Claims 168-172 have been added. Reconsideration and allowance of all claims are respectfully requested in view of the following remarks.

The Examiner has objected to the drawings filed June 20, 2001, stating that the drawings are not clear in differentiating the different parts and beams. The Examiner is respectfully requested to acknowledge receipt of 6 sheets of Formal Drawings, which clearly distinguish the different parts of the invention.

The Examiner has objected to Claim 75 due to a grammatical error. The claims have been amended to assure that they contain no grammatical errors.

The Examiner has objected to Claims 93, 94, and 103, under 35 U.S.C. §112, second paragraph, as being indefinite. The claims have been amended to ensure that the claims are definite. However, the Applicants submit that the amendments that have been made to the claims are not narrowing amendments or related to patentability, as defined by the Supreme Court in Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd., et al., on May 28, 2002 (2002 U.S. LEXIS 3818), but rather, are simply for reasons of proper form.

The Examiner has rejected Claims 1-89 and 104 under 35 U.S.C. §102(b) as being anticipated by Ulmer et al. The Examiner has rejected Claims 90-104 under 35 U.S.C. §103 as being unpatentable over Ulmer et al. in view of Grier et al. Claims 20, 22, 55, 56, and 82 have been canceled. For the following reasons, the prior art rejections are respectfully traversed.

The Applicants respectfully submit that Ulmer et al. do not teach or suggest a method of forming a configurable array of probes, including the steps of selected at least two probes for inclusion in a three

dimensional array, and containing each selected probe with an optical trap to form the array, as recited in amended Claims 1, 23, 57, 63, 89, and 104.

Rather, Ulmer et al. is silent with respect to forming a three dimensional array of probes, and teaches only trapping one probe at a time, and moving the probes in sequence to different positions for interaction with different chemicals, all in a single plane. Although the Examiner alleges that Ulmer et al. disclose the trapping of several particles simultaneously, the particles are not held in a communal diffusional space as in the present invention, but rather, Ulmer et al. disclose trapping of the particles in parallel, which leads to having to repeat the disclosed sequences over again (see Ulmer et al., col. 12, lines 37-53). However, in the present invention, with the use of a three dimensional array, multiple probes can be generated and moved by the optical traps simultaneously.

Accordingly, Claims 1, 23, 57, 63, 89, and 104, are not anticipated by (nor obvious over) Ulmer et al., and the rejection of Claims 1, 23, 57, 63, 89, and 104, under 35 U.S.C. §102(b), over Ulmer at al. should be withdrawn.

With respect to Claims 90-104, the Applicants respectfully submit that one of ordinary skill in the art would not have combined Ulmer et al. with Grier et al. in order to achieve the claimed features of the present invention.

Rather, Ulmer et al. is directed to scanned optical tweezers, which are different from the holographic tweezers of Grier et al. In the scanned optical tweezers of Ulmer, there is one beam of light to one optical trap, and if it is scanned fast enough, several particles can be trapped simultaneously (see Ulmer et al., col. 12, lines 37-53). However, only one trap at a time is lit up.

In contrast, the Grier et al. utilizes holographic optical tweezers where each beam is lit up all the time on each of the multiple optical traps. There is no scanning being performed in the same sense as Ulmer et al.

The benefit of Grier et al. over Ulmer et al., is that the holographic optical tweezers have a lower rate of photodegradation and can hold more particles in wider field of view, than the scanned optical tweezers of Ulmer et al.

Thus, since the two inventions are directed to different types of optical tweezers, one of ordinary skill in the art would not have combined the references in order to meet the claimed features of the present invention.

Further, in comparison to Grier et al. and Ulmer et al., in the present invention, a pattern can be made in three dimensions and not just in one plane, as in Ulmer et al. Further, the chemistry is different between the present invention and that of Ulmer et al, for example. In Ulmer et al., the sphere has to be moved from place to place, but in the present invention, due to the three-dimensional aspect, the probes are just organized in an array.

Accordingly, Claims 90-104 are not obvious over either the individual or the combination of the Ulmer et al. and Grier et al. references, and the rejection of Claims 90-104 under 35 U.S.C. §103 should be withdrawn.

Further, since Claims 2-19, 24, 26, 27, 30, 40, and 42-44 depend from Claim 1, Claims 25, 28, 29, 31-39, 41, and 45-54, depend from Claim 23, Claims 58-61 depend from Claim 57, Claims 64-81, and 83-88 depend from Claim 63, and Claims 91-103 depend from Claim 90, they are also patentably distinguishable over either the individual or the combination of the Ulmer et al. and Grier et al. references for the reasons cited above with respect to Claims 1, 23, 57, 63, and 90.

With respect to new Claims 168-172, the Applicants respectfully submit that neither Ulmer not Grier et al. teaches or suggests generating a plurality of movable optical traps independently and simultaneously within a vessel. Rather, as stated above, Ulmer et al. disclose trapping one particle at a time in a single plane, using scanned optical tweezers, and are not directed to generating a plurality of

optical traps simultaneously and independently in an array, as in the present invention.

Accordingly, Claims 168-172 are patentable.

If the Examiner believes that there is any issue which could be resolved by a telephone or personal interview, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number listed below.

Applicants hereby petition for any extension of time which may be required to maintain the pendency of this case, and any required fee for such an extension is to be charged to Deposit Account No. 19-3140.

Respectfully submitted,

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Page 6, the third paragraph after the heading "DESCRIPTION OF THE DRAWINGS" was amended as follows:

FIG. 3A illustrates an overview of a system for forming an array of probes, and FIG. 3B illustrates a variation of FIG. 3A.

Page 9, the second full paragraph, was amended as follows:

Illustrated in FIG. [3] 3A is an overview of a system to generate and control a configurable array, generally designated as 20. Optical traps 1000-1004 (FIG. 1) are formed by passing a collimated light, preferably a laser beam 100, produced by a laser 102 to a beam splitter 30. The beam splitter 30 is constructed of a dichroic mirror, photonic band gap mirror, omnidirectional mirror, or other similar device. The beam splitter 30 selectively reflects the wavelength of light used to form the optical traps and transmits other wavelengths. A portion of the reflected light is then passed through a beam altering optical element 22 disposed substantially in a plane 24 conjugate to a planar back aperture 28 of the focusing lens 12 into the subject cell.

For this implementation to be generally useful, it would be necessary to alternate turning on the beam altering optical element 22 and laser 102 to create traps and then turning off the laser and beam altering optical element 22 to create images.

Page 9, the fourth full paragraph, continuing to page 10, was amended as follows:

When the laser beam 100 is directed through the beam altering optical element 22, the beam altering optical element produces a plurality of beamlets having an altered phase profile. Depending on the number and type of optical traps desired, the alteration may include refraction, diffraction, wavefront

shaping, phase shifting, steering, diverging and converging.. Thus, the laser beam 100 proceeds from area A' on the beam splitter 30 to area A on the beam altering optical element 22 and through area B at the back aperture 28 [aperture] of the focusing lens 12 thereby effectively overlapping all the *beamlets* at the back aperture of the focusing lens. The *beamlets* are then converged as the pass through the focusing lens 12 thereby producing the optical gradient conditions necessary to form the optical traps.

Page 10, the third full paragraph was amended as follows:

Examples of suitable dynamic beam altering optical elements having a time dependent aspect to their function include computer generated diffractive patterns, phase shifting materials, liquid crystal phase shifting arrays, micro-mirror arrays, piston mode micro-mirror arrays, spatial light modulators, electro-optic deflectors, [accousto-optic] acousto-optic modulators, deformable mirrors, reflective MEMS arrays and the like. With a dynamic beam altering optical element, the media which comprises the beam altering optical element can be altered, to change the phase pattern imparted to the focused beam of light which results in a corresponding change in the phase profile of the focused beam of light, such refraction, diffraction, or convergence.

Page 11, the first paragraph was amended as follows:

The beam altering optical element is also useful to impart a particular topological mode to the laser light. Accordingly, one *beamlet* may be formed in a [Guass-Laguerre] helical mode while another *beamlet* is formed in a [Guassian] Gaussian mode.

Page 11, the fourth and fifth paragraphs, continuing to page 12, were amended as follows:

One example of an application of the system illustrated in FIG. [3] 3A is to troll the probes through the media 3000 (FIG. 1) containing the targets T1-T5. (FIG. 1) By containing the probes optically, as opposed to physically, and moving the probes within the subject cell 10 the opportunity for interaction of a probe with each target is increased, thus improving the speed and efficiency of the assay.

Another example of an application of the system illustrated in FIG. [3] 3A us that upon completion of the assay, selection can be made, via computer 38 and/or operator 36, of which probes to discard and which to collect. The re-configurable nature of the array allows for selective movement of a given optical trap and contained probe. In some cases the media 3000 and unbound targets will be removed or flushed from the subject cell 10 through an outlet port 18 and the assay will be completed. In other cases at least some of the probes still contained by optical traps, are reused with additional targets to perform further assays. This technique can be useful in the case of probes that tested positive or negative, depending on the parameters of the assay. In yet other cases, because the array of probes is re-configurable as to the quantity and quality of probes forming the array, the optical traps can be used to discard unbound probes and acquire additional probes for further experimentation.

Page 12, the first full paragraph was amended as follows:

Another example of an application of the system illustrated in FIG. 3 is to interrogate cells by spectrum and create an array of probes from selected interrogated cells. Spectroscopy of a sample of biological material can be accomplished with an imaging illumination 39 suitable for either inelastic spectroscopy or polarized light back scattering, the former being useful for assessing chemical structure, and the [later] latter being suited for measuring nucleus size. For instance, a computer 38 can be used to analyze the spectral data and to identify suspected cancerous, pre-cancerous and/or non-cancerous cells and direct optical traps to contain selected cell types. The contained cells may then be used as the probes in further assays such as the interaction of other biological material, cells, antibodies, antigens, druges or chemicals on the probes. Those skilled in the art will recognize that the methodology used to interrogate and concentrate cells based on parameters specific to cancerous cells, may be altered, without departing from the scope of the invention, for use with interrogating and/or separating blastomeres, cells, or other material as called out for in the protocol of an assay.

Please replace the second full paragraph with the following new paragraph:

Another example of an application of the system illustrated in FIG. [3] 3A is for investigating targets by spectrum. The spectrum of those probes which had positive results (have bound targets) can be obtained by using imaging illumination 39 such as that suitable for either inelastic spectroscopy or polarized light back scattering. The computer 38 can analyze the spectral data to identify the desired targets and direct the optical array to segregate those desired targets. Those skilled in the art will recognize that the methodology use to segregate targets based on spectral data may be altered, without departing from the scope of the invention, to identify and/or segregate targets based on other information obtainable from the targets and/or the optical data stream. The wavelengths of the laser beam 100 used to form arrays for investigating biological material include the infrared, near infrared, visible green, visible red, and visible blue from about 400 nm to about 1.06 [mu.m] mm.

Page 12, the third full paragraph, continuing to page 13, was amended as follows:

An additional example of an application of the array is the use of a static, transmissive beam altering optical element to direct the array. The static beam altering optical element 40, such as a hologram or grating, as illustrated in FIG. 4 can be used to form a pre-determined range of optical traps. Using the static beam altering element 40 in situations where limited movement and/or reconfiguration of the array is adequate has the advantage of not requiring the computer processing power necessary to calculate the varying phase pattern available with a dynamic beam altering optical element. Although the static transmissive beam altering optical element illustrated in FIG. 4 is shown with a fixed surface 41 and [discreet] discrete regions 42-26, a static beam altering optical element, either transmissive or reflective, may also have a substantially continuously varying non-homogenous surface, or a combination of [discreet] discrete regions, and substantially continuously varying regions.

Page 13, the second full paragraph was amended as follows:

To move the probes 500-502 from position one P1 to position two P2, the static beam altering optical element 40 is rotated around a spindle 47 (which may be attached to a controlled motor (not

shown)) to align the laser beam with region two 43 which will generate the second set of optical traps at position two P2. By constructing the second set of optical traps in the appropriate proximity to the former location of the first set of optical traps the probes can be passed from set of optical traps to set of optical traps. The sequence may continue passing the probes from position two P2 to position three P3, from position three P3 to position four P4, and from position four to position five P5 by the rotation of the beam altering optical element to align the appropriate region 42-46 corresponding to the desired position P1-P5. The time interval between the termination of one set of optical traps and generation of the next should be adequate to allow passage of the [to] probes before they drift. One use of this system, as described within, is to troll the probes through the media thereby providing opportunity to have targets within the media interact with the probes. This type of simple movement may also be useful in moving the probes from a sub-cell 16 (FIG. 1) to another area of the subject cell 10, or segregating probes into a sub-cell 16.

Page 15, the first full paragraph was amended as follows:

To generate the optical traps, a laser beam is directed through a fiber optic cable 150 out a collimator end 151 and reflected off the dynamic surface 59 of the optical element 51. The beam of light (not shown) exiting the collimator end 151 of the fiber optic 150 is [defracted] <u>diffracted</u> by the active surface 59 of the optical element 51 into a plurality of beamlets (not shown). The beamlets then reflect off the first mirror M1 through the first set of transfer optics TO1 down the first light channel 53a through the second set of transfer optics TO2 to the second mirror M2; and are directed at the dichroic mirror 58 up to the back aperture 57 of the objective lens 56, are converged through the objective lens 56, thereby producing the optical gradient conditions necessary to form the optical traps.

Page 15, after the fourth full paragraph, the following new paragraph was inserted:

<u>FIG. 3B shows a variation on FIG. 3A. FIG. 3B shows a holographic optical tweezer configuration closer to the implementation of FIG. 6A and 6B.</u>

In FIG. 3B, a telescope consisting of lenses 55, 57 create a plane 26 conjugate to the input plane 24 of the focusing lens 12. The center of the conjugate plane 26, labeled point A, is conjugate to the center of the back aperture 28, labeled point B. Any beam passing through or emanating from point A passes through point B and forms an optical trap 10 in the subject cell. The beam-altering optical element 22 is centered on point A and diffracts input laser beam 100 into a fan-out of beamlets 101, 102, etc., each of which emanates from point A, and thus, each of which forms an optical trap 10.

This configuration separates the trap forming part of the optical train from the imaging part so that trapping and imaging can proceed simultaneously. In this case, the beam splitter 30 must be chosen to selectively reflect the trap forming laser light and to transmit the image-carrying light 32.

IN THE CLAIMS:

Claims 20, 22, 55, 56, and 82 were canceled.

The claims were amended as follows:

1. (Amended) A method of forming a configurable array of probes comprising:

generating movable optical traps within a vessel;

providing at least two probes, each with one of a known binding [or] and reactivity characteristic, within the vessel;

selecting at least said two probes for inclusion in [an] a three dimensional array;

containing each of the selected [probe] probes with an optical trap to form the array; and[,]

tracking at least one of the two probes using the optical trap which contains it.

2. (Amended) The method of claim [1] 21, further comprising:

altering [the] a position of at least one probe in the array by moving the optical trap containing the probe.

3. (Amended) The method of claim [1] 21, wherein the optical traps are formed of two or more of optical tweezers, optical vortices, optical bottles, optical [rotator] rotators, [or] and light cages.

5. (Amended) The method of claim 2, wherein [the] a movement of each optical trap is controlled by a computer.

6. (Amended) The method of claim 4, wherein [the] a movement of each optical trap is controlled by a computer.

7. (Amended) The method of claim 4, wherein at least one of the two probes is selected by measuring a spectrum of the at least one probe and using [the] a spectrum measurement to select the at least one probe.

8. (Amended) The method of claim 4, wherein at least one of the probes is selected by segregating the at least two probes, by [the] known characteristics, at pre-determined locations within the vessel and using [the] a location of each segregated probe to select the probe.

9. (Amended) The method of claim 8, further comprising:

placing the selected probes into at least one physical sub-cell disposed within the vessel.

11. (Amended) The method of claim [1] 21, wherein the probe is a biological material.

12. (Amended) The method of claim [1] 21, wherein the probe is a chemical material.

17. (Amended) The method of claim 11, wherein the probe is one of an oligonucleotide, a polynucleotide, a chemical compound, a protein, a saccharide, a ligand, a cell, an antibody, an antigen, a

cellular organelle, a lipid, a blastomere, an aggregations of cells, a microorganism, a peptide, cDNA, and RNA, or combinations thereof.

18. (Amended) The method of claim 13, wherein the biological material is one of an oligonucleotide, a polynucleotide, a chemical compound, a protein, a saccharide, a ligand, a cell, an antibody, an antigen, a cellular organelle, a lipid, a blastomere, an aggregations of cells, a microorganism, a peptide, cDNA, and RNA, or a combination thereof.

19. (Amended) The method of claim 15, wherein the target is selected from one or more of the group consisting of an oligonucleotide, a polynucleotide, a chemical compound, a protein, a saccharide, a ligand, a cell, an antibody, an antigen, a cellular organelle, a lipid, a blastomere, an aggregations of cells, a microorganism, a peptide, cDNA, and RNA, or a combination thereof.

21. (Amended) The method of claim 1, [further comprising] wherein at least some of the probes are [all] either one of bound to a substrate and unbound to a substrate.

23. (Amended) A method of forming a dynamic, configurable array of probes, [the method] comprising:

generating movable optical traps within a vessel;

monitoring the optical traps;

providing at least two probes, each with one of a known binding [or] and reactivity characteristic, within the vessel;

selecting at least two probes for inclusion in [an] a three dimensional array;

containing each of the selected [probe] probes with an optical trap to configure the array; and,

tracking at least one of the selected probes using the optical trap which contains it.

24. (Amended) The method of claim 20, further comprising:

altering [the] a position of at least one probe in the array by moving the optical trap containing the probe.

25. (Amended) The method of claim [23] 54, the method further comprising:

producing an optical data stream.

27. (Amended) The method of claim 24, wherein [the] a movement of each optical trap is controlled by a computer.

28. (Amended) The method of claim 25, [the method] further comprising:

receiving the optical data-stream with a computer.

29. (Amended) The method of claim 28, the method further comprising:

analyzing the optical data stream with the computer.

30. (Amended) The method of claim [27] 29, wherein the computer directs the movement of at least one optical trap based on [the] an analysis of the optical data stream.

31. (Amended) The method of claim 25, further comprising:

converting the optical data-stream to a video signal.

32. (Amended) The method of claim 31, further comprising:

receiving the video signal with a computer.

33. (Amended) The method of claim 32, further comprising:

analyzing the video signal with the computer.

34. (Amended) The method of claim 33, further comprising:

using the computer to direct [the] a movement of one or more optical traps based on the analysis of the video signal.

36. (Amended) The method of claim 35, further comprising:

[an operator] viewing the image and directing [the] a movement of one or more optical traps based on the viewing of that image.

37. (Amended) The method of claim 25, further comprising:

analyzing [the] a spectrum of the optical data-stream.

38. (Amended) The method of claim 37, [the method] further comprising:

using a computer to direct [the] a movement of one or more optical traps based on the analysis of spectrum of the optical data stream.

39. (Amended) The method of claim [23] 54, further comprising:

forming two or more of one of optical tweezers, optical vortices, optical bottles, optical rotators, [or] and light cages.

40. (Amended) The method of claim 26, wherein [the] a movement of each optical trap is controlled by a computer.

41. (Amended) The method of claim [23] 54, wherein at least one of the selected probes is selected by measuring a spectrum of at least one probe and using the spectral measurement to select the probe.

42. (Amended) The method of claim 24, wherein at least one of the selected probes is selected by segregating the probes, by [the] known characteristics, at pre-determined locations within the vessel and using [the] a location of each probe as [the] a criteria to select the probe.

43. (Amended) The method of claim 42, further comprising:

placing the selected probes into at least one physical sub-cell disposed within the vessel.

45. (Amended) The method of claim [23] 54, wherein the probe is a biological material.

46. (Amended) The method of claim [23] 54, wherein the probe is a chemical material.

51. (Amended) The method of claim 45, wherein the probe is one of an oligonucleotide, a polynucleotide, a chemical compound, a protein, a saccharide, a ligand, a cell, an antibody, an antigen, a cellular organelle, a lipid, a blastomere, an aggregations of cells, a microorganism, a peptide, cDNA, and RNA, or combination thereof.

52. (Amended) The method of claim 47, wherein the target is one of an oligonucleotide, a polynucleotide, a chemical compound, a protein, a saccharide, a ligand, a cell, an antibody, an antigen, a cellular organelle, a lipid, a blastomere, an aggregations of cells, a microorganism, a peptide, cDNA, and RNA, or a combination thereof.

53. (Amended) The method of claim 49, wherein the target is selected from one or more of the group consisting of an oligonucleotide, a polynucleotide, a chemical compound, a protein, a saccharide, a ligand, a cell, an antibody, an antigen, a cellular organelle, a lipid, a blastomere, an aggregations of cells, a microorganism, a peptide, cDNA, and RNA, or a combination thereof.

54. (Amended) The method of claim 23, wherein at least some of the probes are [all] either one of bound and unbound to a substrate.

57. (Amended) A method of assaying biological material [the method] comprising:

generating movable optical traps within a vessel;

providing a fluid media in the vessel;

providing at least two probes, each with a known characteristic for one of binding [or] and reacting with a biological [tarket] target, within the vessel;

selecting at least two probes for inclusion in [an] a three dimensional array;

containing each of the selected [probe] probes with the optical trap;

introducing into the vessel biological targets; and,

determining [the] whether a reaction [or lack thereof] takes place, [of] between each of the selected probes with each of the targets.

58. (Amended) The method of claim 57, further comprising:

tracking each probe of the selected probes throughout the assay using the optical trap which contains it.

61. (Amended) The method of claim 59, wherein the probe is one of an oligonucleotide, a polynucleotide, a chemical compound, a protein, a saccharide, a ligand, a cell, an antibody, an antigen, a

cellular organelle, a lipid, a blastomere, an aggregation of cells, a microorganism, a peptide, cDNA, and RNA, or combination thereof.

62. (Amended) The method of claim 57, wherein the target is one of an oligonucleotide, a polynucleotide, a chemical compound, a protein, a saccharide, a ligand, a cell, an antibody, an antigen, a cellular organelle, a lipid, a blastomere, an aggregation of cells, a microorganism, a peptide, cDNA, and RNA, or combination thereof.

63. (Amended) A method of assaying biological material comprising:

generating movable optical traps within a vessel;

providing a fluid media in the vessel;

monitoring the optical traps;

providing at least two probes, each with a known characteristic for one of binding [or] and reacting with a biological target, within the vessel;

selecting at least two probes for inclusion in [an] a three dimensional array;

containing each of the selected [probe] probes with the optical trap;

introducing into the vessel biological targets; and[,]

determining whether a [the] reaction [or lack thereof] takes place, [of] between each of the probes with each of the targets.

64. (Amended) The method of claim 63, further comprising:

tracking each probe throughout the assay using the optical trap which contains it.

65. (Amended) The method of claim 63, further comprising:

altering [the] a position of at least one probe in the array by moving the optical trap containing the probe.

66. (Amended) The method of claim 63, further comprising:

producing an optical data stream.

67. (Amended) The method of claim 65, wherein [the movement of each optical trap is wherein] each optical trap is movable independently of [the] other probes.

68. (Amended) The method of claim 65, wherein [the] a movement of each optical trap is controlled by a computer.

69. (Amended) The method of claim 66, further comprising:

receiving the optical data-stream with a computer.

70. (Amended) The method of claim 69, further comprising:

analyzing the optical data stream with the computer.

71. (Amended) The method of claim 70, further comprising:

using [a] the computer to direct [the] a movement of one or more optical traps based on the analysis of the optical data stream.

72. (Amended) The method of claim 66, further comprising:

converting the optical data-stream to a video signal.

73. (Amended) The method of claim 72, further comprising:

receiving the video signal with a computer

74. (Amended) The method of claim 73; further comprising:

analyzing the video signal with the computer.

75. (Amended) The method of claim 74, further comprising:

using the computer to direct [the] movement of one or more optical traps based on the analysis s of the video signal .

77. (Amended) The method of claim 76, further comprising:

[an operator] viewing the image and directing the movement of one or more optical traps based on the viewing of that image.

78. (Amended) The method of claim 66, further comprising:

analyzing [the] a spectrum of the optical data-stream.

79. (Amended) The method of claim 78, further comprising:

using a computer to direct [the] movement of one or more optical traps based on the analysis of spectrum of the optical data stream.

80. (Amended) The method of claim 63, further comprising:

forming two or more different classes of optical traps selected from the group consisting of optical tweezers, optical vortices, optical bottles, optical rotators, and light cages.

81. (Amended) The method of claim 63, wherein at least one of the probes is either one of bound and unbound to a substrate.

83. (Amended) The method of claim 81, wherein each of [all] the substrates which bind the [binding] probes having the same known characteristic contain the same label.

85. (Amended) The method of claim 84, wherein at least one of the probes is selected by measuring [the] a spectral response of at least one probe and using the spectral measurement to [decide] determine whether to contain the probe.

86. (Amended) The method of claim 63, wherein at least one selected probe is accomplished by segregating the probes, by [the] each known [characteristics] characteristic, at pre-determined locations within the vessel and using [the] a location of each probe to select the probe.

87. (Amended) The method of claim 63, further comprising:

placing the selected probes into at least one physical sub-cell disposed within the vessel.

88. (Amended) The method of claim 86, wherein the sub-cell is an optical sub-cell.

89. (Amended) A method of forming a configurable array of probes comprising:

generating movable optical traps within a vessel:

providing at least two probes, each with one of a known binding [or] and reactivity characteristic, within the vessel; and,

configuring [an] a three dimensional array of at least two probes by selecting each probe with an optical trap.

90. (Amended) A method of forming a configurable array of probes comprising:

directing a focused beam of light at a beam altering optical element to form a plurality of beamlets:

overlapping the beamlets at [the] a back aperture of a focusing lens;

passing the beamlets through the focusing lens and converging the beamlets to generate movable optical traps within the vessel;

providing [at] a plurality of probes, each with one of a known binding [or] and reactivity [character] characteristic, within the vessel;

selecting at least two probes for inclusion in [the] a three dimensional array;

containing each selected probe with the optical trap; and,

altering [the] a position of at least one probe by moving the optical trap containing the probe.

91. (Amended) The method of claim 90, wherein the beam altering optical element has a static surface.

92. (Amended) The method of claim 91, wherein the static surface is comprised of two or more discreet non-homogeneous regions.

93. (Amended) The method of claim 92, wherein [the] a position of at least one probe trap is altered by changing [the discreet] a discrete non-homogeneous region of the static surface receiving the beam of light.

94. (Amended) The method of claim 91, wherein the static surface is continuously varying.

95. (Amended) The method of claim 91, wherein [the] a position of the at least one optical trap is altered by changing [the] a region of the static surface receiving the beam of light .

96. (Amended) The method of claim 91, wherein the beam altering optical element is one of a grating, a diffraction grating, a reflective grating, a transmissive grating, a hologram, a stencil, a light

shaping holographic filter, a polychromatic hologram, a lens, a mirror, a prism, a waveplate and a hologram.

97. (Amended) The method of claim 92, wherein each [discreet] discrete non-homogeneous region is one of a grating, a diffraction grating, a reflective grating, a transmissive grating, a hologram, a stencil, a light shaping holographic filter, a polychromatic hologram, a lens, a mirror, a prism, a waveplate and a hologram.

98. (Amended) The method of claim 90, wherein the beam altering optical element is dynamic.

99. (Amended) The method of claim 98, wherein [the] a position of the at least one optical trap is altered by varying the dynamic beam altering optical element.

100. (Amended) The method of claim 99, wherein varying the dynamic beam altering optical element alters [the] a phase profile of the at least one of the beamlets [beamlet].

101. (Amended) The method of claim 100, wherein the optical trap generated by [the] a change in phase profile is one of an optical tweezer, [a] an optical [vortice] vortex, an optical bottle, an optical rotator, and a light cage.

102. (Amended) The method of claim 93, wherein changing the [discreet] discrete non-homogeneous region alters the phase profile of the at least one of the beamlets [beamlet].

103. (Amended) The method of claim 102, wherein the optical trap generated by [the] a change in phase profile is one of an optical tweezer, an optical vortice, an optical bottle, an optical rotator, and a light cage

104. (Amended) A method of assaying a biological material comprising:

generating movable optical traps within a vessel;

providing a fluid media in the vessel;

monitoring the optical traps;

providing biological material within the vessel;

illuminating the biological material with a source suitable for spectral measurement;

measuring the spectrum of the biological material;

using the spectral [measurements] measurement to select the biological material to use as probes in a three dimensional array;

containing the selected biological probes with an optical trap;

introducing into the vessel biological targets; and,

determining [the] whether a reaction [or lack thereof] takes place, [of] between each of the probes with each of the targets.

Claims 168-172 were added.